

### 1) Explain the functionality of linked list.

A linked list consists of two parts: information and the link. In the single connected listening, the beginning of the list is marked by a unique pointer named start. This pointer does point to the first element of the list and the link part of each node consists of an arrow looking to the next node, but the last node of the list has null pointer identifying the previous node. With the help of start pointer, the linked list can be traversed easily.

### 2) What are the four basic principles of OOPS?

The four basic principles of Object-Oriented Programming System are listed below:

- **Abstraction:** Abstraction is a process of hiding the implementation details and showing only functionality to the user. For example, sending SMS where you type the text and send the message. You don't know the internal processing about the message delivery.
- Abstraction lets you focus on what the object does instead of how it does it.
- **Inheritance:** Inheritance in Java is a mechanism in which one object acquires all the properties and behaviors of a parent object.
- **Encapsulation:** Encapsulation in Java is a process of wrapping code and data together into a single unit, for example, a capsule which is mixed of several medicines.
- **Polymorphism:** Polymorphism in Java is a concept by which we can perform a single action in different ways. Polymorphism is derived from 2 Greek words: poly and morphs. The word "poly" means many and "morphs" means forms. So polymorphism means many forms.

### 3) What is inheritance?

In, Object-Oriented Programming, inheritance is a mechanism based on classes.

**Inheritance** refers to inhering the data members and properties of a parent class to a child class. A class which is derived from another level is often called as a sub-class or a child class, and the type from which the child class is obtained is known as super-class or parent class.

### 4) What is the way of inheriting variable of one class to any other class?

```
1. //Base Class
2. class A
3. {
4. public int a;
5. }
6. //Derived Class
7. class B : A
8. {
9. a=15;
10. }
```

### 5) What is Polymorphism?

Polymorphism is a concept in OOPS which means having many forms. In simple words, it means that different actions will be performed in different instances. Polymorphism is of two types:

1. Method overloading
2. Operator overloading

## 6) What are the different types of inheritance?

### Types of Inheritance:

1. Single inheritance
2. Multiple Inheritance
3. Multi-level Inheritance
4. Multi-path Inheritance
5. Hierarchical Inheritance
6. Hybrid Inheritance

## 7) What is the difference between classes and interface?

The differences between classes and interfaces are listed below:

- A class can be instantiated by creating its object, whereas interfaces cannot be instantiated as all the methods in the interface are abstract and do not perform any action, so there is no use of instantiating an interface.
- A class is declared using class keyword whereas an interface is declared using interface keyword.
- The members of the class can have access specifier such as public, protected, and private but members of the interface can not have the access specifier, all the members of the interface is declared as public because the interface is used to derive another class. There will be no use to access specifies inside the members of an interface.
- The methods inside the class are defined to perform some actions on the fields declared in the class whereas interface lacks in asserting in areas, the ways in an interface are purely abstract.
- A class can implement any number of the interface but can only extend one superclass. Whereas interface can reach any number of interfaces but cannot perform any interface.
- A class can have a constructor defined inside the class to declare the fields inside the class, whereas interface doesn't have any constructor defined because there are no fields to be initialized.

## 8) What is software development life-cycle?

**Software development life-cycle** is steps involved in the life cycle of software development phase. Generally, it is followed by the development team which develops the software in the organization. It consists of a clear explanation of developing and maintaining the software.

## 9) What is normalization of databases, joins, and keys?

Normalization is process of organizing data in a database efficiently. Two goals of the normalization process are: to eliminate redundant data (for example, storing the same data in more than one

table) and also ensure data dependencies make sense (only storing related data in a table). These both are important as they reduce the amount of space a database consumes and ensure that data is logically stored.

### **10) What are loops?**

Loops are used to execute block of statement several times in a program depending upon the conditional statement. The basic structure of a circuit is given above in the diagram. For each successful execution of the loop, the conditional statement should be checked. If the conditional statement is true, then the circuit will be executed. If the conditional statement is false, then the course will be terminated.

### **11) Explain about Joins, Views, Normalization, Triggers?**

The JOIN keyword is used in an SQL statement to query data from two or more tables, based on a relationship between specific columns in these tables.

Tables in a database are often related to each other with keys.

A view is a virtual table. A look contains rows and columns, just like a real table. The fields in a picture are fields from one or more real tables in the database.

You can add SQL functions, WHERE, and JOIN statements to a view and present the data as if the data were coming from one single table.

### **12) List different advantages of DBMS**

Improved data sharing.

The list of several advantages of DataBase Management System:

- Improved data security.
- Better data integration.
- Minimized data inconsistency.
- Improved data access.
- Improved decision making.
- Increased end-user productivity.

### **13) What is Database Management System?**

A DataBase Management System is a software system used for creating and managing databases. DBMS make it possible for the end user to build and maintain databases. DBMS provides an interface between the end user/application and the databases.

### **14) What is database Schema?**

The formal definition of the database schema is a set of formulas (sentences) called integrity constraints imposed on a database.

### **15) What are the conditional statements?**

The conditional statements can alternatively be called as conditional expression also. Conditional comments are the set of rules which were executed if a particular condition is true. It is often referred to an if-then statement because if the state is true, then the statement is executed.

### 16) What is the difference between the foreign key and reference key?

Reference Key is the primary key that is referenced in the other table (linked via the other tables Foreign Key). Foreign Key is how you connect the second table to the primary tables Primary Key (or Reference Key).

### 17) What is the difference and similarity between C and C++?

C++ has classes whereas C did not have classes.

C does not support function overloading. In C, for input or output, we use functions like gets(), puts(), scanf(), printf(), etc

C does not support exception handling.

### 18) The structural difference between bitmap and b-tree index?

#### Btree

It is made of branch nodes and leaf nodes. Branch nodes hold prefix key value along with the link to the leaf node and the leaf nodes contain the indexed value and rowid.

#### Bitmap

It consists merely of bits for every single distinct value. It uses a string of bits to locate rows in a table quickly. It is used to index low cardinality columns.

### 19) What is the difference between a Clustered index and non-clustered index?

#### Clustered Index

- Only one per table
- Faster to read than non clustered as data is physically stored in index order

#### Non-Clustered Index

- Can be used lot of times per table
- Quicker for insert and update operations than a clustered index

### 20) Differentiate between socket and session?

Socket is the Combination of IP address and Port Number (in pairs)

The session is a Logical Connectivity between the source and destination.

### 21) What is an array?

An array is a collection of similar elements. For an array, the necessary condition is that the data type of all the elements in the array must be same. The declaration of an array in C++ is as follows:

```
int a[10];
```

This defines an array whose name is a and has ten elements from index 0-9

22) Given an array of 1s and 0s arrange the 1s together and 0s together in a single scan of the array. Optimize the boundary conditions.

```
1. #include<stdio.h>
2. #include<conio.h>
3. void main()
4. {
5.     int A[10]={ '0','1','0','1','0','0','0','1','0','1','0','0'};
6.     int x=0,y=A.length-1;
7.     while(x
8. x++;
9. else if(A[y])
10. y--;
11. if(A[x] && !A[y])//here we are checking that stating index is having 1 and last index having 0 than s
    wap values
12. A[x]=0,A[y]=1;
13. }
14. getch();
15. }
```

### 23) Define Data Abstraction. What are their importance?

Abstraction is process of recognizing and focusing on essential characteristics of a situation or object and leaving/filtering out the unwanted components of that situation or object.

Abstraction is the basis for software development. It's through this concept we define the essential aspects of a system. The process of identifying and designing the ideas for a given system is called Modeling ( objectmodeling).

Three levels of data abstraction are:

1. **Logical level:** Information stored in the database. e.g., Database administrator
2. **Physical level:** Where data is stored physically in the database.
3. **View level:** End users always work on view level. If any amendment is made it may be saved by another name.

### 24) Write a function to swap two numbers without using a temporary variable.

```
1. void swap(int &i, int &j)
2. {
3.     i=i+j;
4.     j=i-j;
5.     i=i-j;
```

6. }

## 25) Memory Allocation in C/C++

The `calloc()` function allocates a memory area; the length will be the product of its parameters (it has two settings). `calloc` fills the memory with ZERO's and returns a pointer to the first byte. If that fails to locate enough space, it returns a NULL pointer.

A `malloc()` function allocates a memory area; length will be the value entered as parameter. (it has one parameter). It does not initialize memory area

The `free()` function is used to free the allocated memory(allocated through the `calloc` and `malloc`), in other words, this used release the allocated memory

`new` also used to allocate memory on the heap and initialize the memory using constructor

`delete` also used release memory allocated by `new` operator

## 26) Write output of the program?

1. `int i=10;`
2. `printf("%d%d%d",i,++i,i++);`

Answer= 10 12 12

## 27) what is virtual function and pure virtual function?

**Virtual function:-** To achieve polymorphism, function in base class is declared as virtual. By state virtual, we make a base class pointer to execute the purpose of any derived class depends on the content of pointer (any acquired class address).

**Pure Virtual Function:-** This is the function used in base class, and its definition has to be provided in derived class, In other pure virtual function has no definition in the base is declared as :

1. `virtual void fun()=0;`

It means that this function is not going to do anything, In case of pure virtual function derived function has to

implement a pure virtual function or redeclare it as a pure virtual function

## 28) What are WPF and WCF?

WPF/WCF application, need in .NET 3.0 Framework. These application will cover the following concepts:

### WCF(Windows Communication Foundation)

- The new service orientated attributes
- The use of interfaces

- The use of callbacks
- Asynchronous delegates
- Creating the proxy

## WPF( Windows Presentation Foundation )

- Styles
- Templates
- Animations
- Databinding

### 29) Write a program in C to swap two numbers without help of a third variable.

```

1.  /*
2.   * C++ program to swap two numbers without using a temporary variable
3.   */
4.  #include<iostream>
5.  using namespace std;
6.
7.  /* Function for swapping the values */
8.  void swap(int &a, int &b)
9.  {
10.     b = a + b;
11.     a = b - a;
12.     b = b - a;
13. }
14. int main()
15. {
16.     int a, b;
17.
18.     cout << "Enter two numbers to be swapped : ";
19.     cin >> a >> b;
20.     swap(a, b);
21.     cout << "The two numbers after swapping become : " << endl;
22.     cout << "Value of a : " << a << endl;
23.     cout << "Value of b : " << b << endl;
24. }
```

### 30) What will be output of the following code?

```

1.  // file name: Main.java
2.
3.  class Complex {
4.     private double re, im;
5.
6.     public Complex(double re, double it) {
7.         this.re = re;
8.         this.im = im;
9.     }
```

```
10. }
11.
12. // Driver class to test the Complex level
13. public class Main {
14.     public static void main(String[] args) {
15.         Complex c1 = new Complex(10, 15);
16.         System.out.println(c1);
17.     }
18. }
```

**31) Find the output of the following program.**

```
1. public class Prg {
2.     public static void main(String args[]){
3.         System.out.print("A" + "B" + 'A');
4.     }
5. }
```

**32) What will be the output of following program ?**

```
1. public class Prg {
2.     public static void main(String args[]){
3.         System.out.print('A' + 'B');
4.     }
5. }
```

**33)What will be output of following program?**

```
1. public class Prg {
2.     public static void main(String[] args) {
3.         char [] str={'i','n','c','l','u','d','e','h','e','l','p'};
4.         System.out.println(str.toString());
5.     }
```

**34) What will be output of following program?**

```
1. public class pg {
2.     public static void main(String[] args) {
3.         System.out.print("Hello");
4.         System.out.println("Guys!");
5.     }
```

**35) What will be output of following program?**

```
1. class Test2 {
2.     public
3.     static void main(String[] args)
4.     {
5.         byte x = 12;
6.         byte y = 13;
```



```
7.     byte result = x + y;
8.     System.out.print(result);
9. }
```

### 36) What will be output of following program?

```
1. #include <stdio.h>
2. union test {
3.     int x;
4.     char arr[8];
5.     int y;
6. } u;
7. int main()
8. {
9.     printf("%u", sizeof(u));
10.    return 0;
11. }
12.
```

### TCS HR Interview Questions

#### 1) Tell us something about yourself.

My name is Abhinav. I belong to Delhi. I was born in my native place and brought up in Delhi. I am a person who likes to explore new areas and meet new people. Coming to my academics, I have passed my B.Tech from GNIOT, Greater Noida with 64%. I have secured 72% in Class XII and 8.2 CGPA in Class X. In my family, I have a father, mother, grandfather & grandmother and me. I had a work experience of x months in Javatpoint at Noida as a content writer and had gained a lot of knowledge about various languages.

#### 2) Do you wish to change your domain? If yes, why?

I want to work in an organization where I can develop the skill set gained from my Educational background as well as develop skills which will benefit throughout my career as regarding this job, this job is entirely connected with my domain of expertise, and also it helps me to enhance my communication skills which have been on my to-do list. So I want to get associated with such a big organization and also improve skill sets that I have always been wanting to upgrade.

#### 3) Describe an experience of yours wherein you were asked to do something which you didn't like to do and how you handled it?

This is a typical question which tests your presence of mind and your communication skills. Gather any instance from your life and speak on that.

For your reference, a sample answer is provided. Your answer will be different from this one, but it might be of some help.

I have many life instances where I had to perform tasks which I did not like performing but as these tasks were mandatory hence backing off was not an option I could afford. One such memory I would like to share was from my 9th grade when we had to study Sanskrit as our school did not have option between Hindi and Sanskrit after class 9th so initially I did not care about this subject but when I started researching it I found that this subject is quite complicated and also I realized that I was not all good at remembering things, hence this subject became a difficult task for me but as I told backing off was not an option so I decided to take help from my parents, friends and other reliable sources and worked hard throughout the remaining time and at last the hard work paid off though I did not score excellent marks I achieved marks which I could not have believed I could score a few months back.

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#### 4) What are your expectations from the company?

Though this answer is objective and can be different for different persons but remember be positive in your thoughts and do not say many things about the company which gives the interviewer an illusion that you are exaggerating.

In short, be realistic and precise.

I have from a long time wanted to work with an IT company which treats its employees in the best way it can. I have always wanted to work with an organization which provides a very comfortable and home like work environment and when it comes to TCS I find that both the requirements are fulfilled. Even requirements I can hardly imagine are met, most importantly I get the opportunity to learn and enhance my skill set to become a better professional in the future.

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#### 5) Will you be comfortable relocating?

Remember this answer requires a clear-cut reply and wants to know as the company might provide time to time travel hence do not try to be good and if you are not able to change places tell them explicitly if they have any positions for that kind of post they will consider you. Also, refer to the sample answer given below.

Yes, as part of growing up I used to travel a lot as my father is an ex-serviceman hence occasionally he used to be posted throughout the country. Though I would prefer my city as it helps me live with people, I care about, but at the same time, I am ok with relocating.

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#### 6) What is it like to live in Delhi (your state)?

You can tell unique things about your states; this may consist of things which you might or want to improve, as a said before stick to being realistic.

Delhi is one of the busiest cities in India and though I do not have any knowledge of towns outside India hope it will also be the most active of all. Delhi like Mumbai never sleeps and in Delhi, as we know have lots of places to wander and explore. Also being central to many states and the Capital of India it is the center of attraction for many, and hence due to constant migration, we find a

variety of people residing in Delhi. Also, Delhi has all kinds of markets, and also it has hospitals and facilities which are top notch and can be compared to best across the globe. Hence, living in Delhi is like a dream come true.

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### 7) Tell me something about the most memorable day of your life?

By this question, the interviewer wants to check whether you can cope with on-the-spot situations, take some time gather your thoughts and speak up.

The most memorable day of my life would without any second thought be the day when I passed my graduation. That day I felt like now I can get a respectable job lead an independent life and slowly and steadily I have turned from a dependent boy to independent man. I am now mature enough to take my life decisions and decide what is right for me and what is not. That day I realized why my grandfathers and old people are so nostalgic and have so many memories associated with the Independence of our country and such small word independence could have such massive meaning attached to it.

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### 8) What are your strengths?

Never tell strengths which you cannot prove on the spot. And speak only the forces that are true.

In my opinion, I am a team player I have always loved working as a team, performing for the betterment of the team has ever made me proud and getting to handle captaincy or leadership of my colleagues has always been the work I always loved.

Also, things that are hard to get I love getting them, though it sounds bit confusing to understand so let me elaborate with an instance, After my graduation I had not acquired skills required to get an excellent job through my communication skills were ok but I really lacked in technical part, and it was easy for me to take nonprofessional job also they had an attractive pay scale and it was difficult for me to learn programming skills and become good in coding but I decided to get things the hard way and work till I succeed and thereafter I worked on technical domain and here I am .So hard work eventually pays off.

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### 9) What are your weaknesses?

Though this is a tricky question but doesn't be the bait, i.e., the interviewer wants to know your weakness but tell him weakness such that they are also in some way your strengths.

Though it is difficult to see your weakness yourself as we all know the general human tendency is to shift the blame and never take the responsibility for some wrongdoing. But to be honest, I find that when I want to achieve something, I work hard to get that though it might not be worth it to work so hard for the happiness that I get after attaining I work hard, so in the meantime I miss out on another event concurrently happening.

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### 10) Why should we hire you?

A quite typical question and needs to be answered sensibly.

The requirement for this job completely matches my skill set, as a candidate I have experience working in this domain which might be beneficial for the organization as well as me. Also, I am a quick learner and a team player so the organization won't have to spend much time and resources on me. Even when I work, I work for the maximum benefit of the organization. Moreover, I would gain exposure to the industry which will be very beneficial to my career.

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### 11) Is there anything which makes you different from other candidates?

Again...Be realistic

Yes, there are lots of things which distinguish me as an individual. Every individual is different. But if you ask about positive qualities in me, then I would say I am a team player, quick learner and have some leadership qualities. Though these thoughts are objective to individual and can be known better when you know me as an individual.

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### 12) What are your views on demonetization?

This is a significant topic of discussion, and I have a lot of things to say, but considering the short duration of this interview I would like to summarize this like:

- It was a very significant decision I would say, but not that great on the implementation part.
- The government should have taken a stand on so many people died during the initial period.
- The objective was not met entirely as not many people having black money were caught.
- The GDP of our country had increased.
- All in all, there are many positives and negatives in this action hence to reach a conclusion would not do justice.

### 13) Tell me about your daily routine?

Just describe your routine.

Nowadays, I have quite a hectic schedule, and I have long been reaching out for a holiday or break, but as you ask I would describe my routine as:

I wake up at 0700hours. I perform all my daily chores and get ready to leave for office at about 0800 hours. I commute by metro, and then I reach my office at an estimated time of 0930 hours. I work there till 1300 hours and then we have a half an hour break, after the break, we get back to work, and I have a Java class from 1530 to 1700, and after completing the course, I work for about 90 minutes, and at 1830 hours I depart for home. Again my house is 90 minutes ride in metro, and by 2000 hours I reach home and watch a great movie and by the time the film is finished I am off to sleep and the day is finished and next day again back to work.

14) Mention any five qualities that a person should have for this profile?

Depends on the job.

15) Speak on any topic of your interest for at least 5 minutes.

You have to speak on any topic.

16) Describe the experience of visiting any place during your vacations.

You need to describe any experience.

17) Do you have any prior work experience? If so tell us about your last job and why you left it.

You can tell about your work experience, and why left it but don't give any negative answer as they have a negative impact. Answer like for growth, for a better opportunity, to enhance your skill set further.

18) What are your hobbies?

You can tell your hobbies. You must prepare for questions from your hobbies.

19) What quality do you think a leader should have?

There are many qualities that a leader should have but to name a few, a leader should be able to coordinate a team, he should have excellent understanding of people and their behavior at different points of time, he should be able to find people he can depend on, he should be able to be distinguished in a crowd of people, he should be able to instruct a group of people, he should be dominant and many more are there.

20) Have you applied anywhere before applying here? How many job offers have you received before this?

**what is your strongest programming language (Java, ASP, C, C++, VB, HTML, C#, etc.)?**

**Point to remember:** Before interview You should decide your Favorite programming language and be prepared based on that question.

## **2.Differences between C and Java?**

- 1.JAVA is Object-Oriented while C is procedural.
- 2.Java is an Interpreted language while C is a compiled language.
- 3.C is a low-level language while JAVA is a high-level language.
- 4.C uses the top-down approach while JAVA uses the bottom-up approach.
- 5.Pointer go backstage in JAVA while C requires explicit handling of pointers.
- 6.The Behind-the-scenes Memory Management with JAVA & The User-Based Memory Management in C.
- 7.JAVA supports Method Overloading while C does not support overloading at all.
- 8.Unlike C, JAVA does not support Preprocessors, & does not really them.
- 9.The standard Input & Output Functions--C uses the printf & scanf functions as its standard input & output while JAVA uses the System.out.print & System.in.read functions.
- 10.Exception Handling in JAVA And the errors & crashes in C.

## **3.In header files whether functions are declared or defined?**

Functions are declared within header file. That is function prototypes exist in a header file,not function bodies. They are defined in library (lib).

## **4.What are the different storage classes in C ?**

There are four types of storage classes in C. They are extern, register, auto and static

## **5.What does static variable mean?**

Static is an access qualifier. If a variable is declared as static inside a function, the scope is limited to the function,but it will exists for the life time of the program. Values will be persisted between successive calls to a function

## **6.How do you print an address ?**

Use %p in printf to print the address.

## **7.What are macros? what are its advantages and disadvantages?**

Macros are processor directive which will be replaced at compile time.

The disadvantage with macros is that they just replace the code they are not function calls. similarly the advantage is they can reduce time for replacing the same values.

## **8.Difference between pass by reference and pass by value?**

Pass by value just passes the value from caller to calling function so the called function cannot modify the values in caller function. But Pass by reference will pass the address to the caller function instead of value if called function requires to modify any value it can directly modify.

## **9.What is an object?**

Object is a software bundle of variables and related methods. Objects have state and behavior

## 10.What is a class?

Class is a user-defined data type in C++. It can be created to solve a particular kind of problem. After creation the user need not know the specifics of the working of a class.

## 11.What is the difference between class and structure?

Structure: Initially (in C) a structure was used to bundle different type of data types together to perform a particular functionality. But C++ extended the structure to contain functions also.

The major difference is that all declarations inside a structure are by default public.

Class: Class is a successor of Structure. By default all the members inside the class are private.

## 12. What is pointer?

**Pointer** is a variable in a program is something with a name, the value of which can vary. The way the compiler and linker handles this is that it assigns a specific block of memory within the computer to hold the value of that variable.

## 13.What is the difference between null and void pointer?

A Null pointer has the value 0. void pointer is a generic pointer introduced by ANSI. Generic pointer can hold the address of any data type.

## 14.what is function overloading

**Function overloading** is a feature of C++ that allows us to create multiple functions with the same name, so long as they have different parameters. Consider the following function:

```
int Add(int nX, int nY)
{
    return nX + nY;
}
```

## 15.What is function overloading and operator overloading?

Function overloading: C++ enables several functions of the same name to be defined, as long as these functions have different sets of parameters (at least as far as their types are concerned). This capability is called function overloading. When an overloaded function is called, the C++ compiler selects the proper function by examining the number, types and order of the arguments in the call. Function overloading is commonly used to create several functions of the same name that perform similar tasks but on different data types.

Operator overloading allows existing C++ operators to be redefined so that they work on objects of user-defined classes. Overloaded operators are syntactic sugar for equivalent function calls. They form a pleasant facade that doesn't add anything fundamental to the language (but they can improve understandability and reduce maintenance costs).

## 16.what is friend function?

**A friend function** for a class is used in object-oriented programming to allow access to public, private, or protected data in the class from the outside.

Normally, a function that is not a member of a class cannot access such information; neither can an external class.

Occasionally, such access will be advantageous for the programmer. Under these circumstances, the function or external class can be declared as a friend of the class using the friend keyword.

## 17.What do you mean by inline function?

The idea behind inline functions is to insert the code of a called function at the point where the function is called. If done carefully, this can improve the application's performance in exchange for increased compile time and possibly (but not always) an increase in the size of the generated binary executables.

## 18. Tell me something about abstract classes?

An abstract class is a class which does not fully represent an object. Instead, it represents a broad range of different classes of objects. However, this representation extends only to the features that those classes of objects have in common. Thus, an abstract class provides only a partial description of its objects.

### **19.What is the difference between realloc() and free()?**

The free subroutine frees a block of memory previously allocated by the malloc subroutine. Undefined results occur if the Pointer parameter is not a valid pointer. If the Pointer parameter is a null value, no action will occur. The realloc subroutine changes the size of the block of memory pointed to by the Pointer parameter to the number of bytes specified by the Size parameter and returns a new pointer to the block. The pointer specified by the Pointer parameter must have been created with the malloc, calloc, or realloc subroutines and not been deallocated with the free or realloc subroutines. Undefined results occur if the Pointer parameter is not a valid pointer.

### **20.What is the difference between an array and a list?**

Array is collection of homogeneous elements. List is collection of heterogeneous elements.

For Array memory allocated is static and continuous. For List memory allocated is dynamic and Random.

Array: User need not have to keep in track of next memory allocation.

List: User has to keep in Track of next location where memory is allocated.

Array uses direct access of stored members, list uses sequential access for members.

### **21.What are the differences between structures and arrays?**

Arrays is a group of similar data types but Structures can be group of different data types

### **22.What is data structure?**

A data structure is a way of organizing data that considers not only the items stored, but also their relationship to each other. Advance knowledge about the relationship between data items allows designing of efficient algorithms for the manipulation of data.

### **23. Can you list out the areas in which data structures are applied extensively?**

Compiler Design,

Operating System,

Database Management System,

Statistical analysis package,

Numerical Analysis,

Graphics,

Artificial Intelligence,

Simulation

### **24.What are the advantages of inheritance?**

It permits code reusability. Reusability saves time in program development. It encourages the reuse of proven and debugged high-quality software, thus reducing problem after a system becomes functional.

### **25. what are the two integrity rules used in DBMS?**

The two types of integrity rules are referential integrity rules and entity integrity rules. Referential integrity rules dictate that a database does not contain orphan foreign key values. This means that

A primary key value cannot be modified if the value is used as a foreign key in a child table. Entity integrity dictates that the primary key value cannot be Null.

### **26. Tell something about deadlock and how can we prevent dead lock?**



In an operating system, a deadlock is a situation which occurs when a process enters a waiting state because a resource requested by it is being held by another waiting process, which in turn is waiting for another resource. If a process is unable to change its state indefinitely because the resources requested by it are being used by other waiting process, then the system is said to be in a deadlock.

**Mutual Exclusion:** At least one resource must be non-shareable.[1] Only one process can use the resource at any given instant of time.

**Hold and Wait or Resource Holding:** A process is currently holding at least one resource and requesting additional resources which are being held by other processes.

**No Preemption:** The operating system must not de-allocate resources once they have been allocated; they must be released by the holding process voluntarily.

**Circular Wait:** A process must be waiting for a resource which is being held by another process, which in turn is waiting for the first process to release the resource. In general, there is a set of waiting processes,  $P = \{P_1, P_2, \dots, P_N\}$ , such that  $P_1$  is waiting for a resource held by  $P_2$ ,  $P_2$  is waiting for a resource held by  $P_3$  and so on till  $P_N$  is waiting for a resource held by  $P_1$ . [1][7]

Thus prevention of deadlock is possible by ensuring that at least one of the four conditions cannot hold.

**27. What is Insertion sort, selection sort, bubble sort( basic differences among the functionality of the three sorts and not the exact algorithms)**

**28. What is Doubly link list?**

A doubly linked list is a linked data structure that consists of a set of sequentially linked records called nodes. Each node contains two fields, called links, that are references to the previous and to the next node in the sequence of nodes. The beginning and ending nodes' previous and next links, respectively, point to some kind of terminator, typically a sentinel node or null, to facilitate traversal of the list. If there is only one sentinel node, then the list is circularly linked via the sentinel node. It can be conceptualized as two singly linked lists formed from the same data items, but in opposite sequential orders.

**29.What is data abstraction? what are the three levels of data abstraction with Example?**

Abstraction is the process of recognizing and focusing on important characteristics of a situation or object and leaving/filtering out the un-wanted characteristics of that situation or object.

Lets take a person as example and see how that person is abstracted in various situations

A doctor sees (abstracts) the person as patient. The doctor is interested in name, height, weight, age, blood group, previous or existing diseases etc of a person

An employer sees (abstracts) a person as Employee. The employer is interested in name, age, health, degree of study, work experience etc of a person.

Abstraction is the basis for software development. Its through abstraction we define the essential aspects of a system. The process of identifying the abstractions for a given system is called as Modeling (or object modeling).

Three levels of data abstraction are:

1. Physical level : how the data is stored physically and where it is stored in database.
2. Logical level : what information or data is stored in the database. eg: Database administrator
- 3.View level : end users work on view level. if any amendment is made it can be saved by other name.

**30.What is command line argument?**

Getting the arguments from command prompt in c is known as command line arguments. In c main function has three arguments.They are:

Argument counter  
Argument vector  
Environment vector

**31.Advantages of a macro over a function?**

Macro gets to see the Compilation environment, so it can expand #defines. It is expanded by the preprocessor.

### 32.What are the different storage classes in C?

Auto,register,static,extern

### 33.Which header file should you include if you are to develop a function which can accept variable number of arguments?

stdarg.h

### 34.What is cache memory ?

Cache Memory is used by the central processing unit of a computer to reduce the average time to access memory. The cache is a smaller, faster memory

which stores copies of the data from the most frequently used main memory locations. As long as most memory accesses are cached memory locations, the average latency of memory accesses will be closer to the cache latency than to the latency of main memory.

### 35.What is debugger?

A **debugger** or debugging tool is a computer program that is used to test and debug other programs

### 36. Const char \*p , char const \*p What is the difference between the above two?

1) const char \*p - Pointer to a Constant char ('p' isn't modifiable but the pointer is)

2) char const \*p - Also pointer to a constant Char

However if you had something like:

char \* const p - This declares 'p' to be a constant pointer to an char. (Char p is modifiable but the pointer isn't)

### 37. What is Memory Alignment?

Data structure alignment is the way data is arranged and accessed in computer memory. It consists of two separate but related issues: data alignment and data structure padding.

### 38.Explain the difference between 'operator new' and the 'new' operator?

The difference between the two is that **operator new** just allocates raw memory, nothing else. The **new operator** starts by using operator new to allocate memory, but then it invokes the constructor for the right type of object, so the result is a real live object created in that memory. If that object contains any other objects (either embedded or as base classes) those constructors as invoked as well.

### 39. Difference between delete and delete[]?

The keyword delete is used to destroy the single variable memory created dynamically which is pointed by single pointer variable.

Eg: int \*r=new(int)

the memory pointed by r can be deleted by delete r.

delete [] is used to destroy array of memory pointed by single pointer variable.

Eg:int \*r=new(int a[10])

The memory pointed by r can be deleted by delete []r.

### 40. What is conversion constructor?

A conversion constructor is a single-parameter constructor that is declared without the function specifier 'explicit'. The compiler uses conversion constructors to convert objects from the type of the first parameter to the type of the conversion constructor's class.To define implicit conversions, C++ uses conversion constructors, constructors that accept a single parameter and initialize an object to be a copy of that parameter.

#### 41.What is a spanning Tree?

A spanning tree is a tree associated with a network. All the nodes of the graph appear on the tree once. A minimum spanning tree is a spanning tree organized so that the total edge weight between nodes is minimized.

#### 42. Why should we use data ware housing and how can you extract data for analysis with example?

If you want to get information on all the techniques of designing, maintaining, building and retrieving data, Data warehousing is the ideal method. A data warehouse is premeditated and generated for supporting the decision making process within an organization.

Here are some of the benefits of a data warehouse:

- o With data warehousing, you can provide a common data model for different interest areas regardless of data's source. In this way, it becomes easier to report and analyze information.

- o Many inconsistencies are identified and resolved before loading of information in data warehousing. This makes the reporting and analyzing process simpler.

- o The best part of data warehousing is that the information is under the control of users, so that in case the system gets purged over time, information can be easily and safely stored for longer time period.

- o Because of being different from operational systems, a data warehouse helps in retrieving data without slowing down the operational system.

- o Data warehousing enhances the value of operational business applications and customer relationship management systems.

- o Data warehousing also leads to proper functioning of support system applications like trend reports, exception reports and the actual performance analyzing reports.

**Data mining is a powerful new technology to extract data for analysis.**

#### 43.Explain recursive function & what is the data structures used to perform recursion?

- a) A recursive function is a function which calls itself.

- b) The speed of a recursive program is slower because of stack overheads. (This attribute is evident if you run above C program.)

- c) A recursive function must have recursive conditions, terminating conditions, and recursive expressions.

Stack data structure . Because of its LIFO (Last In First Out) property it remembers its caller so knows whom to return when the function has to return. Recursion makes use of system stack for storing the return addresses of the function calls. Every recursive function has its equivalent iterative (non-recursive) function. Even when such equivalent iterative procedures are written, explicit stack is to be used.

#### 44.Differentiate between Compiler and Interpreter?

An interpreter reads one instruction at a time and carries out the actions implied by that instruction. It does not perform any translation. But a compiler translates the entire instructions

#### 45.What is scope of a variable?

Scope refers to the visibility of variables. It is very useful to be able to limit a variable's scope to a single function. In other words, the variable will have a limited scope

#### 46.What is an interrupt?

**Interrupt** is an asynchronous signal informing a program that an event has occurred. When a program receives an interrupt signal, it takes a specified action.

#### 47.What is user defined exception in Java?

The keywords used in java application are try, catch and finally are used in implementing user-defined exceptions. This Exception class inherits all the methods from Throwable class.

#### 48.What is java Applet?

Applet is a java program that can be embedded into HTML pages. Java applets run on the Java-enabled web browsers such as Mozilla and Internet Explorer. An applet is designed to run remotely on the client browser, so there are some restrictions on it. An applet can't access system resources on the local computer. Applets are used to make the web site more dynamic and entertaining.

#### 49.What do you know about the garbage collector?

Garbage collection is the systematic recovery of pooled computer storage that is being used by a program when that program no longer needs the storage. This frees the storage for use by other programs (or processes within a program). It also ensures that a program using increasing amounts of pooled storage does not reach its quota (in which case it may no longer be able to function).

Garbage collection is an automatic memory management feature in many modern programming languages, such as Java and languages in the .NET framework. Languages that use garbage collection are often interpreted or run within a virtual machine like the JVM. In each case, the environment that runs the code is also responsible for garbage collection.

#### 50.Write a Binary Search program

```
int binarySearch(int arr[],int size, int item)
{
    int left, right, middle;
    left = 0;
    right = size-1;

    while(left <= right)
    {
        middle = ((left + right)/2);

        if(item == arr[middle])
        {
            return(middle);
        }

        if(item > arr[middle])
        {
            left = middle+1;
        }
        else
        {
            right = middle-1;
        }
    }

    return(-1);
}
```

#### 51.What are enumerations?

An enumeration is a data type, used to declare a variable that stores a list of names. It acts like a database, which will store a list of items in the variable. example: enum shapes{triangle, rectangle,...

## **52.What is static identifier?**

The static identifier is used for initializing only once, and the value retains during the life time of the program / application. A separate memory is allocated for "static" variables. This value can be used between function calls. The default value of an uninitialized static variable is zero. A function can also be defined as a static function, which has the same scope of the static variable.

## **53.What is Cryptography?**

Cryptography is the science of enabling secure communications between a sender and one or more recipients. This is achieved by the sender scrambling a message (with a computer program and a secret key) and leaving the recipient to unscramble the message (with the same computer program and a key, which may or may not be the same as the sender's key).

There are two types of cryptography: Secret/Symmetric Key Cryptography and Public Key Cryptography

## **54.What is encryption?**

Encryption is the transformation of information from readable form into some unreadable form.

## **55.What is decryption?**

Decryption is the reverse of encryption; it's the transformation of encrypted data back into some intelligible form.

## **56.What exactly is a digital signature?**

Just as a handwritten signature is affixed to a printed letter for verification that the letter originated from its purported sender, digital signature performs the same task for an electronic message. A digital signature is an encrypted version of a message digest, attached together with a message.